

HISTORICAL REVIEW OF THE DEPARTMENT OF ANATOMY
OF THE OHIO STATE UNIVERSITY

1959 - 1968

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INTRODUCTION

Revitalization, modernization, and new ideas best characterize the Department of Anatomy at The Ohio State University during the past decade. These changes are reflected in great measure by the resurgence of interest in medical education, the re-examination of medical curriculum throughout the country, and by increased governmental support of research. Introspection and thoughtful re-evaluation of the philosophy, needs, approaches, and methods of teaching anatomy to freshmen medical students has become a hallmark of the Anatomy Faculty in the College of Medicine. How best to prepare the individual students for their future role as physicians, capable of adapting and growing with the explosive expansion of knowledge in the anatomical disciplines and medicine, provided the fundamental and underlying impetus. Extensive and continuous changes in the approaches and concepts of teaching the anatomical disciplines were visualized in several computerized anatomy programs in addition to other self-instructional techniques, all of which have been integrated into the departmental teaching. Emphasis has been placed upon independent learning, self-reliance, and active student participation. Motivation and understanding of the anatomical sciences have been enhanced through greater awareness of fundamental concepts and interdisciplinary correlation of subject material and functional clinical relevancy.

The Department has shown a steady increase in productive research. Funds derived through governmental support of research, the University and the College of Medicine for the Department have brought a bright and modern look to the teaching and research laboratories. New and specialized equipment has permitted the

exploration of the new frontiers in anatomy, particularly in the realm of cellular and histobiology and the neuroanatomical sciences.

The acquisition of new and young faculty members dedicated to both research and teaching has brought the formation of a new and progressive Department of Anatomy. The enlargement of staff and faculty during recent years has resulted in a marked reduction in the excessive teaching load demanded of the Departmental Faculty during the earlier portion of this 10-year period. Thus, individual faculty members were finally able to achieve a more even balance of teaching and research, enabling them to develop both these potentials. The amalgamation of new ideas with the older more classical concepts of anatomy changed the outlook of the entire teaching program in the Department for medical and graduate students, and established newly-oriented areas of individual and cooperative research. Thus, a more vigorous graduate program became possible. The Department of Anatomy has developed a new look and new attitudes through the combined efforts of each of the members of the faculty and under the direction and guidance of former Chairman Linden F. Edwards (1957-1961) and present Chairman Grant O. Graves (1961-present).

ADMINISTRATIVE ORGANIZATION

The administrative organization of the Department of Anatomy consists of the Chairman, Vice-Chairman, Chairman of the Graduate Committee, and several small committees concerned with certain intra-departmental affairs. Dr. Linden F. Edwards served as Chairman of the Department from 1957-1961 following the retirement of Dr. Ralph A. Knouff. Dr. Grant O. Graves served as Vice-Chairman from 1959 until 1961 when he became Acting Chairman following Dr. Edwards' resignation in order to devote more time to teaching and writing. In 1962, Dr. Graves assumed the Chairmanship and appointed Dr. George R. L. Caughran as Vice-Chairman (1964-present). A graduate committee has served to organize, innovate, and expand the

graduate program. The position of Chairman of the Graduate Committee has rotated and has been under the direction of Drs. G. Adolph Ackerman, James L. Hall, Ralph A. Knouff, Ronald L. St. Pierre, and John C. Weston during this period. As indicated, the administrative load of the Department has been shared by the faculty organized in smaller committees.

By the very nature of anatomy, the subject material is divisible into several independent disciplines, subject areas, and research interests, viz., microscopic anatomy or cellular and histobiology, embryology and genetics, neuroanatomy, and neurobiology, human gross and comparative anatomy. However, with the increasing staff in the Department, the termination of the undergraduate arts major in anatomy, the deletion of comparative anatomy and embryology as a pre-medical requirement, and most recently, the reorganization of the University's College of Arts and Sciences with the formation of a College of Biological Sciences in 1967, most of the undergraduate courses in anatomy have been deleted. Only the courses (2) required by the School of Allied Medical Profession and the School of Nursing were retained. With these changes, individual faculty members became primarily responsible for teaching a single subject or discipline. Under the guidance and persuasion of Dr. Grant O. Graves, two separate teaching tracts or approaches to anatomy for freshmen medical students was evolved. These tracts employed different teaching and instructional methods and have necessitated the formation of two separately subject-oriented faculties within the Department. Each tract-subject discipline has been provided with its own leader and coordinator.

For administrative purposes, several faculty members engaged exclusively in the special area of Medical Education have been incorporated into the Department of Anatomy. This group is headed by Dr. Ralph W. Ingersoll. The developments and research activities of the Division of Medical Education is discussed separately in the compiled history of the College of Medicine.

TEACHING

Undergraduate: Between 1958 and 1967 the undergraduate courses offered by the Department of Anatomy consisted of comparative and mammalian anatomy, embryology, comparative and general histology, elementary and comparative neuroanatomy, neuromuscular anatomy, anatomy of the eye, histological technique, and minor research problems in anatomy. Drs. Henry W. Aplington, Katherine Aplington, Thomas G. Hayes, Margaret H. Hines, F. John Julyan, John E. King, W. James Leach, and Edna P. Wooten were involved with the comparative and mammalian anatomy dissecting courses. Drs. Thomas G. Hayes, John E. King, Ralph A. Knouff, and Beth L. Wismar taught the courses in microscopic anatomy; Drs. John M. Delphia, Robert C. Struthers and John C. Weston were concerned with embryology; Drs. James L. Hall and Albert O. Humbertson instructed in neuroanatomy; Drs. John C. Weston taught histological technique, and Dr. Irma Eglitis and Dr. Martha (Welch) Sucheston taught the course on the anatomy of the eye. Students in the undergraduate program consisted primarily of those in the pre-medical curriculum, nursing, physical education, those pursuing an undergraduate major in anatomy, and students in allied medicine including occupational therapy and optometry. Based upon the total course enrollment in the various undergraduate courses offered by the Department of Anatomy, student enrollment rose nearly 25% between 1959 and 1966 (1287 to 1691 student course enrollment) and consisted of 42% to 52% of the students taking course work within the Department. With the transfer of most of the undergraduate program to the College of Biological Sciences in 1967, the undergraduate enrollment dropped to 541 in 1967-1968 thereby representing a 68% decrease over the maximum student enrollment. Only two undergraduate courses were retained in the College of Medicine, viz., general or introductory anatomy and neuromuscular anatomy; these courses have students registered either in nursing, pharmacy, or in the allied medical areas. It is of interest to note that only about one-third of the Department's course enrollment during most of the past ten years has been

devoted to freshmen medical students; approximately one-third was devoted to courses for the College of Dentistry. Courses involved with teaching freshmen medical and dental students consisted of basic histology, embryology, neuro-anatomy, and human gross anatomy.

<u>COURSE ENROLLMENT</u>	<u>1959-60</u>	<u>1962-63</u>	<u>1965-66</u>	<u>1967-68</u>
Undergraduate	1287	1490	1691	541
Dental	740	740	755	753
Medical	<u>1032</u>	<u>900</u>	<u>894</u>	<u>1872*</u>
TOTAL	3059	3130	3290	3166

*indicates each of the four courses in anatomy were listed quarterly in bulletin; no change in enrollment as compared to earlier years.

Professional: The teaching programs in the Department of Anatomy, College of Medicine have undergone marked change during recent years resulting in a decrease in the total number of hours devoted to each of the anatomical disciplines taught to freshmen medical students, a reduction of 200 hours or nearly 30%.

<u>SUBJECT</u>	<u>1959-60</u>	<u>1960-62</u>	<u>1964-65</u>	<u>1965-66</u>	<u>1966-68</u>
Gross Anatomy	312	294	281	264	230
Embryology, Genetics	-	-	60	62	45
Histology	240	180	188	172	132
Neurology	<u>120</u>	<u>90</u>	<u>120</u>	<u>120</u>	<u>85</u>
TOTAL	672*	564*	649	618	492

*Clinical anatomy was also taught during these periods which would increase the total number of hours by 20.

Teaching methods and philosophy began to evolve in 1962 culminating in the formation of two distinct tracts or approaches to teaching and testing in anatomy. Students were allowed to choose the approach they felt best suited to individual habits and abilities. Clinical correlation was important in both tracts and until 1967 followed similar patterns of presentation. Newly developed teaching aids were employed in both sections.

Tract I employed the classical method of instruction with detailed lectures, compulsory laboratory work in dissecting and microscopic observation, and frequent examinations to evaluate student progress. Except for updating the subject, courses were taught and organized in the manner employed by the Departments of Anatomy throughout the country; loss of contact hours did produce minor changes in the

content and extent of individual subjects. The excellent quality of these courses and their teachers cannot be minimized for those students wishing a strong foundation in anatomy. Personnel principally involved in Tract I were as follows:

Gross Anatomy: Drs. Linden F. Edwards, Irma Eglitis, George R. L. Gaughran, James S. King, and Orville E. Russell; Histology: Drs. Louis V. Caso, John A. Eglitis, Thomas G. Hayes, John E. King, and Donald G. Vernall; Embryology: Drs. Albert O. Humbertson, Orville E. Russell, Donald G. Vernall, and John C. Weston; Neuroanatomy: Drs. Richard M. Don, James L. Hall, James S. King, and Rudolph Kaelbling.

Tract II represents a wide departure from the classical system. Greater emphasis has been placed upon basic concepts, correlation, deductive reasoning, and association of structural and functional aspects of cells, tissues, organs, organ systems, and clinical relevance. Laboratory work has been de-emphasized. Lectures were focused to elaborate anatomical principals and application rather than replicating textbook material. Relatively few lectures were used in gross anatomy while student conferences and prosections served as the principal teacher-directed activity; as in Tract I, the regional approach was employed. Dissections were not mandatory, although groups of students rotated in demonstration dissection throughout the 2-quarter offering of gross anatomy. Free student time was spent in conference, library study, or in special visits to the hospital. Student motivation and correlation was effectively enhanced by presentations from the clinical faculty which served to highlight the important areas of anatomical study. Each anatomical discipline had guest clinical presentations.

Neuroanatomy was the least involved with reorganization of their teaching into separate tracts. As Tract II neuroanatomy was developing, a closer association with gross anatomy was achieved. Integration of the peripheral nervous system and gross anatomy was possible, and completion of head and neck anatomy lead directly to the neuroanatomy sequence. Embryology delved further into genetics

and congenital malformations reducing the time devoted to microscopic examination of early embryonic material and was sequenced following appropriate areas of gross anatomy. Visits to Childrens Hospital became important aspects of embryological teaching. Tract II histology departed markedly from the conventional approach of presentation and examination. Rather than starting with the generalized cell and tissues per se, the course began with organology and emphasized cellular organization, association, and functions as related to given organs and organ systems. An extensive programmed series of Kodachrome photomicrographs enabled extensive reduction in the student's own microscopic study. Correlated practical and didactic examinations were developed using photomicrographic prints or Kodachromes coupled with short answer essays of structural-functional interpretation. All teaching laboratories in anatomy were open to students during their free time. Examinations in Tract II anatomy courses were greatly reduced in number. Correlative examinations for appraisal of Tracts I and II produced equally effective learning; both tracts were liked by the students. Faculty participating principally in Tract II include: Gross Anatomy: Drs. Richard M. Dom, Grant O. Graves, Margaret H. Hines, Albert O. Humbertson, George F. Martin, Jr., Martha (Welch) Sucheston; Histology: Drs. G. A. Ackerman, Ronald L. St. Pierre, John C. Weston, Beth L. Wismar; Neuroanatomy: Drs. Richard M. Dom, Margaret H. Hines, Albert O. Humbertson, Rudolph Kaelbling, George F. Martin, Jr., Martha (Welch) Sucheston; Embryology: Drs. Thomas G. Hayes, Margaret H. Hines, Albert O. Humbertson, Martha (Welch) Sucheston, John C. Weston. Other instructors in the medical curriculum before the separation into the tract system included Drs. Morton Alpert, John Gersten, Joseph A. Grasso, Ralph A. Knouff, Francis W. McCoy, Dwight M. Palmer, Thaddeus Samorajski.

The Department of Anatomy is extensively involved in teaching gross anatomy and histology to freshmen dental students. Neurology was a separate course until 1966 when it became integrated with gross anatomy. Embryology became a freshmen dental course in 1963. Instruction in the dental program included: Gross

Anatomy: Drs. Henry W. Aplington, George D. Boston, Linden F. Edwards, Irma Eglitis, Margaret H. Hines, Robert E. Lauer, Orville E. Russell, Edna P. Wooten; Histology: Drs. G. A. Ackerman, Louis V. Caso, John A. Eglitis, Thomas G. Hayes, John E. King, Donald G. Vernall, John C. Weston, Beth L. Wismar. Neurology: Dr. James L. Hall; Embryology: Drs. John M. Delphia, John E. King.

Graduate: Steady improvement in the quality of graduate training has been possible during the last few years and standards for the doctoral and masters degree were up-graded. Incoming graduate students were able to take the advanced (medical or dental) courses in gross anatomy, histology, neuroanatomy, and embryology, participating and competing with the freshmen medical students. This had not been possible until 1962 and prior to this time nearly all students were directed along a masters program taking courses which received credit in both the undergraduate and graduate school. The emphasis of graduate training has changed from a masters to the doctoral program with increasing emphasis placed upon research and recent developments in one or more of the anatomical disciplines. A qualifying examination for the doctoral program was initiated in 1968 and greater care has been placed upon choosing or selecting students permitted to pursue graduate work. During the 10-year span of this report (1959-1968) 41 Master's and 21 Doctoral Degrees have been granted; only 8 Doctoral Degrees in anatomy had been awarded prior to 1959. Presently, acceptance of graduate students into anatomy is primarily restricted to those seeking the Doctor of Philosophy. A number of advanced courses have been developed for the graduate program, each representing specialized work in the area of each of the anatomical disciplines. A post-graduate course on the visual system was established in 1967 under the guidance of Dr. Irma Eglitis for residents in ophthalmology. Courses in electron microscopy, histochemistry, and the autonomic nervous system were added to the catalogue. Doctoral research activity was directed principally to the areas of histology, hematology, and neuroanatomy. Several members (7) of the present anatomy faculty received their training within the Department after 1958. The development of an awareness and active participation

of both student and faculty in research has provided strong stimulation for the improvement of the graduate program in anatomy. Graduate students carried on their research activity in the laboratory of their adviser rather than in a large community graduate laboratory as in the past. The main financial aid for graduate students has been through graduate assistanceships. Pre-doctoral fellowships from the National Institutes of Health have been granted to 7 students during the training period; graduate school fellowships also have been secured by several of the students. Anatomy Department Graduates obtaining a Master's Degree for the period 1959-1968 are as follows: Bertz, James E., 1960; Burch, James G., 1966; Carpenter, Patricia C., 1963; Chidley, John V., 1967; Craig, Elson L., 1961; Davidorf, Frederick H., 1963; Dollison, James F., Jr., 1968; Ellis, Dennis W., 1967; Evans, Thomas W., 1966; Frugh, Ahmed, 1961; Furman, George J., 1960; Garcia, Martin A., 1967; Glover, Roy A., 1965; Goel, Nawal K., 1960; Grant, Helen K., 1968; Hanson, Diane H., 1964; Harting, John K., 1966; Hightower, James A., 1967; Houser, John W., 1959; Howell, James A., 1967; Isaac, Ronald F., 1963; King, James S., 1962; Lalonde, Ernest R., 1959; Lawrence, Larry S., 1962; Leichnetz, George R., 1966; Levi, James H., 1966; McClish, Robert D., 1959; Marmer, Robert H., 1963; Mayner, Doris A., 1961; Montgomery, William H., 1965; Morimoto, Garth Y., 1960; Myerson, Sheldon B., 1968; Rocco, Henry D., 1959; Schwyn, Robert C., 1963; Schneider, Martin L., 1966; Sneeringer, Sue C., 1961; Starr, Dale R., 1961; Stoup, Charles L., Jr., 1964; Tappan, Carlton H., 1959; Troiano, Marlin F., 1967. Those obtaining the Doctoral Degree are: Bartone, John C., 1961; Gidwani, Joanna N., 1960; Glover, Roy A., 1968¹; Grasso, Joseph A., 1961²; Hayes, Thomas G., 1965¹; Hostetler, Jephtha R., 1968^{1,2}; Jones, Helena S., 1968¹; Humbertson, Albert O., 1962; King, James S., 1965¹; King, John E., 1965¹; Leinonen, Ellen A., 1967; Melfi, Rudy C., 1966; Norvell, John E. III, 1966³; Royce, G. James, 1967²; Schwyn, Robert C., 1966; Self, L. Wade, 1965; Smith, Blanca P., 1964; St. Pierre, Ronald L., 1965¹; Welch, Martha E., 1965; Wismar, Beth L., 1961; Wright, Clarence W., 1964;

¹Predoctoral Fellowship with National Institutes of Health

²Postdoctoral fellowships obtained for further work at other institutions

³Terminal year university graduate fellowship

Special honors and recognitions have come to a number of the members of the Anatomy faculty. The Ohio State University's Distinguished Teacher Award has been presented to two members of the Department of Anatomy, Drs. Ralph A. Knouff in 1961 and Dr. Linden F. Edwards in 1964. The Lederle Medical Faculty Award presented by the Lederle Laboratory, Division of the American Cyanamide Company, for stimulating and encouraging teaching and research in the Medical School was made to Dr. G. Adolph Ackerman 1961-1963 and Dr. Ronald L. St. Pierre 1968-1971. The graduating Senior Medical Class chose Dr. John Gersten in 1963 and Dr. John A. Eglitis in 1965 as Man of the Year. Dr. John Eglitis also was honored by the presentation of the Golden Key Award by the Omicron Kappa Upsilon Honorary Dental Society for outstanding contribution to the education of dental students at The Ohio State University. Dr. Irma Eglitis was elected as Chairman of the Committee on Medical Education and Practice by the American Medical Women's Association in 1967-68 and also has served in all official capacities of the Columbus Chapter of the American Medical Women's Association. In 1968, Dr. Irma Eglitis was elected to the Executive Board of this national organization as the National Secretary. Dr. Beth L. Wismar was appointed to the National Membership Committee of Sigma Delta Epsilon, a womens honorary scientific society in 1968. Dr. Grant O. Graves presided as President of the Midwest Anatomists Association (Regional Division of the American Association of Anatomists) and the Department of Anatomy served as host for the meetings in 1968. Dr. Graves also received the Blue Cross Award of Service in 1965 and was appointed to the Medical Advisory Board in Education Film Production in 1967. Dr. Linden F. Edwards served as Secretary and Treasurer for the Ohio Academy of Medical History in 1963 and was Vice President of the Medical Science Section of the Ohio Academy of Science the same year. Dr. James L. Hall was chosen as the Ohio representative for the neuroanatomy visiting scientist program of the National Institutes of Health in 1964 and Dr. Ronald L. St. Pierre acted as co-chairman for the Regional Developmental Biology Conference held at Ohio State in 1967. Several members of the faculty have been invited to participate in special conferences held throughout the country and abroad (Drs. Ackerman,

Knouff, Martin, and St. Pierre); several also have served as session leaders in the National Meeting of the Anatomists and Histochemists (Drs. Ackerman and St. Pierre). Dr. Ackerman was appointed as an editor for the Anatomical Record in 1968 and was Chairman of the Auditing Committee for the American Association of Anatomists in 1967. Dr. Ronald L. St. Pierre was appointed to the Editorial Staff of TRANSPLANTATION in 1967.

FACILITIES

Along with the rest of Hamilton Hall, the physical facilities in the Department of Anatomy have undergone renovation, viz., painting, air condition, fluorescent lighting, and tiling of the floor. Several new office-research laboratories have been developed by the conversion of former teaching laboratories. New laboratory and teaching furnishings were acquired. An RCA electron microscope with ancillary equipment was obtained in 1961 through funds derived from the University Development Fund. Funds obtained from the College of Medicine enabled the Department to purchase several new research microscopes, standard rotary and ultramicrotomes, photographic equipment, refrigerators, ovens, balances, a stereotactic instrument and a refrigerated centrifuge. This basic equipment has been widely augmented by research funds obtained by individual investigators.

PERSONNEL

The Anatomy Faculty grew from 16 including 4 part-time faculty in 1959 to 21 including 3 part-time individuals in 1968. Faculty members included: G. Adolph Ackerman, 1957-present; Morton Alpert, 1952-1960; Henry W. Aplington, Jr., 1963-1968; Katherine Aplington, 1952-1968; Rollo C. Baker, 1921-present; George D. Boston, 1953-present; Louis V. Caso, 1961-1964; David L. Clark, 1968-present; John M. Delphia, 1961-present; Ayers D'Costa, 1963-present; Richard M. Dom, 1967-present; Linden F. Edwards, 1929-present; Irma Eglitis, 1951-present; John A. Eglitis, 1951-present; Ahmed Frugh, 1960-1961; George R. L. Gaughran, 1961-present;

John Gersten, 1948-1964; Joanna N. Gidwani, 1960-1962; Joseph A. Grasso, 1960-1962; Grant O. Graves, 1935-present; James L. Hall, 1961-1968; Thomas G. Hayes, 1965-present; Margaret H. Hines, 1963-present; Albert O. Humbertson, 1962-present; Ralph W. Ingersoll, 1965-present; Anne Johnson, 1964-1967; F. John Julyan, 1962-1967; Rudolph Kaelbling, 1961-1966; James S. King, 1965-present; John E. King, 1965-present; Stella B. Kontras, 1965-present; Ralph A. Knouff, 1917-1965; Robert E. Lauer, 1965-present; W. James Leach, 1947-1963; George F. Martin, Jr., 1965-present; Francis W. McCoy, 1938-1958; Sally L. Navin, 1968-present; Dwight M. Palmer, 1929-present; Orville E. Russell, 1948-present; Ronald L. St. Pierre, 1965-present; Thaddeus Samorajski, 1956-1960; Robert C. Struthers, 1956-1961; Martha Welch Sucheston, 1965-present; Donald G. Vernall, 1962-present; John C. Weston, 1955-1967; Beth L. Wismar, 1961-present; Edna P. Wooten, 1948-1965.

Research:

Research activity in the Department of Anatomy has been quite diversified during the last ten years with greatest productivity evident in broadly based programs in hematology, hemopoietic tissues and hemopoiesis, immunoematology, general histology and comparative structural and histological aspects of the nervous system. Increased faculty research has been augmented by active participation of graduate students in these programs. Collaborative associations have also been made between anatomy and other Departments in the College of Medicine. The addition of an electron microscope enabled a number of the staff to explore the realm of ultrastructural cytology as related to embryology, neurohistology, and developmental hemopoiesis. Research grant support had been obtained from the National Institutes of Health, Central Ohio Heart Association, Northwestern Ohio Heart Association, American Cancer Society, Life Insurance Medical Research Fund, Developmental Fund Gifts and smaller institutional grants from the College of Medicine. Total grant support for 1967-1968 was \$70,545.39 for 10 faculty members. This increased financial support can be compared with the 1961-1962 figure of \$32,567.00.

for 8 faculty members and 1958-1959 figure of \$44,608.00 for 7 staff members. Along with new equipment and supplies, research support brought the addition of several technicians into the Department. Pre-doctoral fellowships were awarded to several of the graduate students enabling them to pursue their studies and research in greater depth. In 1966, a program was established to allow faculty members leaves of absence to go to other institutions for training in specialized research skills and techniques. In this regard, Dr. Ronald L. St. Pierre spent 9 months in the laboratories of Drs. Chester Zmijewski and Bernard Amos at Duke University, Dr. James S. King worked with Dr. Clement A. Fox in Anatomy at Wayne State University delving into the techniques of ultrastructural neurocytology and Dr. Thomas G. Hayes spent several months studying tissue culture and refined techniques in chromosomal analysis in the laboratory of Dr. Virginia J. Evans at the National Cancer Institute.

Dr. G. Adolph Ackerman: Research has been concerned with the morphology and histochemistry of blood cells and hemopoietic organs in man and animals. The mode and process of cellular differentiation of the hemopoietic cells including lymphocytes have been examined using the techniques of phase and electron microscopy and histochemistry. The embryonic development and differentiation of the cells of hemopoietic organs has been emphasized. Dr. Ackerman's research publications have been numerous and he has contributed chapters in several books dealing with his studies of the lymphocyte, bursa of Fabricius, and thymus. He has participated in several international meetings as well as the New York Academy of Science.

Dr. Morton Alpert: Dr. Alpert worked on adrenal histochemistry and vitamin C assay methods. A selective staining of ceroid pigment in the adrenal was developed before he moved to Indiana University in 1960.

Dr. Henry K. Aplington, Jr.: Histological and selective staining of the hypophysis in *Necturus* and the correlation of changes in the cellular elements in this organ under various experimental conditions were done. Correlations with hormonal assays

and regional hypophyseal analysis resulted in further clarification of the hormonal secretory nature of the different cell forms. Dr. Aplington also completed a textbook of anatomy directed to programs of nursing and occupational therapy.

Dr. David L. Clark: A new member of the Department has been involved with studies of the development of the nervous system as related to the vestibular system and semicircular canals. Both physiological and histological approaches have been employed in the study of the development of the equilibrium as related to the inner ear.

Dr. John M. Delphia: Research has been directed toward experimental embryology. The effects of temperature variation on the development and growth of the avian embryo has been studied; gravitational and vibratory effects also have been investigated. Dr. Delphia has explored the effects of drug-induced hypoxia in mammalian embryos particularly as related to the liver and heart using techniques of histochemistry and biochemistry.

Dr. Richard M. Dom: Dr. Dom in his second year in the Department has utilized both neuroanatomical and neurophysiological techniques in his studies of peripheral nerve conduction and the effects of ischemia upon nerve conduction in the monkey. Studies of the opossum have been initiated to determine somatotopic localization.

Dr. Linden F. Edwards: Research has been concerned with gross anatomy and Ohio medical history. Dr. Edwards has had several publications dealing with the early history as related to medicine and has presented this material to many scientific and local groups. Dr. Edwards has guided the research efforts of a number of graduate students covering such diversified areas as the temporo-mandibular joint, development of the appendix in man, musculature of the jaw in several species of bats and human Eustachian tube.

Dr. Irma Eglitis: Research has centered upon the visual system in man and domestic animals. Great stress has been placed on the description of structures relating to modern ophthalmological research and clinical ophthalmology, e.g., the anatomy of the chamber angle of the eye. Techniques have included special histological and histochemical methods. Productivity of Dr. Eglitis' studies can be measured by

both publications and contributions of chapters in books dealing with the anatomy and histology of the eye. Dr. Eglitis has gained international reputation for her collaboration with other investigators in the field of the visual system.

Dr. John A. Eglitis: Dr. Eglitis has been particularly interested in the microscopic anatomy of glands and epithelial tissues. He has worked on problems dealing with the surface epithelium of the gall bladder, glands of the anal canal (in collaboration with Dr. Irma Eglitis), ellipsoid vessels of the spleen, islets of the pancreas, parathyroid glands, taste buds of the pharynx, and has explored the ultrastructure of the retina.

Dr. George R. L. Gaughran: Interests have been in descriptive gross anatomy. A careful worker, he has made detailed studies of the lateral pharyngeal cleft, the suprapleural membrane and bands and the myohyoid boutonniere, and the parotid compartment in man. He has been working with Dr. Edwards in the preparation of a textbook of anatomy.

Dr. Grant O. Graves: While interested in problems in gross and radiological anatomy, Dr. Graves has spent extensive time and energy in evaluating learning experience as related to medical students and medical education. Critical evaluations have been made of incoming freshmen students and their achievements during the first and subsequent years of medicine. Several significant publications have arisen from these studies. Dr. Graves has gained a national reputation for his approach to teaching anatomy in the medical school.

Dr. James L. Hall: Actively participated in graduate training and his students' research efforts. Dr. Hall was primarily interested in comparative neuroanatomy particularly as pertained to the autonomic nervous system and glial elements. Dr. Hall employed physiological stimulating and stereotactic methods in his investigations.

Dr. Thomas G. Hayes: Studied the splenic vasculature in several species of mammals

using both light and electron microscopic methods. He has become particularly interested in cytogenetics and has been employing karyotype analysis of short-term cultures of blood and bone marrow in man and other mammals. Special studies have been recently begun related to viral and drug-induced chromosomal aberration and histochemical analysis of known sex-linked and non-sex-linked enzyme systems in man.

Dr. Albert O. Humbertson, Jr.: Dr. Humbertson has worked in neurocytology as related to the metabolic demands of neurons and associated structures occurring during degeneration and regeneration of the dorsal root and superior cervical ganglia. Exploration of the morphology of the autonomic nervous system in immunosympathectomized mice have been initiated. Stimulatory, histochemical, and pharmacological methods have been employed in Dr. Humbertson's studies. Drs. Hall and Humbertson have collaborated on several textbook chapters.

Dr. James S. King: Research has encompassed the ultrastructure, histology, and functions of neurons and neuroglia in the central nervous system. The normal cellular structure of various nuclei, synaptology, and the comparative morphology of glial cells and their pathological reactions have been evaluated using electron microscopy and metallic impregnation procedures in several mammals.

Dr. John E. King: Research interests include morphological studies of blood and bone marrow in mammals and birds. Detailed studies of the developing erythrocytic cells have been reported in the embryonic rabbit. An analysis of the histochemistry of the embryonic avian thymus following the administration of testosterone was done and compared with similar studies on the bursa of Fabricius.

Dr. Ralph A. Knouff: Research activity changed from studies of the adrenal glands to developmental hematology with Dr. Ackerman. His stimulation of students and his investigations into the problems of the origin of lymphocytes in the bursa of Fabricius and thymus were particularly noteworthy during this period. He remained an interested and active investigator in his Emeritus Professor status until his death in 1965.

Dr. Francis McCoy: Dr. McCoy delved into the experimental production of auto-immunity and its effects upon connective tissue in the rabbit. The relationship between the adrenal and the juxtaglomerular complex also was studied in man and experimental animals.

Dr. George F. Martin: Dr. Martin's productive research program concerned the pyramidal and extrapyramidal pathways of certain marsupials, particularly the opossum using both stimulatory and degenerative techniques. Lesions were placed in various portions of these systems and postoperative motor deficits noted. Degenerative fiber pathways resulting from these lesions were traced using special neurological staining procedures. These studies represent the initial studies of a long-range program to uncover clues concerning the changing functional significance of the motor systems in phylogeny. Numerous publications have resulted from these investigations.

Dr. Ronald L. St. Pierre: The morphological and functional characteristics of organs, tissues, and cells associated with the immune response in man and animals are under investigation by Dr. St. Pierre. A variety of methods have been utilized including surgical removal of lymphoid organs, hormonal extrapolation of bursa and hormonal interactions, specific tissue antisera and immunosuppression. Pathological alterations of autoimmunity have been investigated in laboratory animals. The problems of donor-recipient matching and immunosuppression have and are being evaluated in human transplantation in collaboration with other investigators in the clinical areas. A number of publications have resulted from these studies and Dr. St. Pierre's work has been well received and has included participation in several invited symposia dealing with immunohematology. He has co-authored a recent text dealing with immunohematology.

Dr. Thaddeus Samorajski: Histochemical studies of the central nervous system and neurohypophyseal tract were done by Dr. Samorajski and the effects of various pharmacological agents upon nervous tissues were initiated prior to his relocation at the Neuropsychiatric Institute in Cleveland in 1961.

Dr. Robert C. Struthers: Studies of the effects of continuous rotation upon developing chick embryos were carried out and alterations in embryological development noted.

Dr. Donald G. Vernall: Dr. Vernall has been evaluating the histology of the cardiac conducting systems, especially the atrio-ventricular portions of this system in man. Differences in the structure of hair also has been studied in several races of man.

Dr. Martha(Welch)Sucheston: Research in developmental anatomy as related to the Eustachian tube and more recently to the human adrenal cortex.

Dr. Beth L. Wismar: Interests have centered around new teaching methods. In histology she has developed a computer approach to organ identification. She has been interested in special staining procedures, the development of the juxta-glomerular complex in the kidney and all aspects of comparative histology.

Dr. John C. Weston: The effects of several hormones upon the embryological growth of avian embryo has been studied and correlated with changes in mitosis and DNA content in hepatic cells. Ultrastructural studies of the mesodermal cells of early avian embryo proved rewarding in noting the passage of ribosomal particles from the nucleus to the cytoplasm, and in expanding our knowledge of the origin and formation of the Golgi complex.

This brief summarization of the research efforts and interests of the anatomy faculty between January 1959 and December 1968 indicates increasing productivity and diversity of techniques, approaches, and anatomical disciplines. A total of 150 (approximation) publications have appeared in books and scientific journals not including abstracts. Further strides and progress will continue as we as a faculty look ahead to new quarters and facilities in the Basic Science Building (under construction) and the expansion in laboratory facilities in Hamilton Hall for those members who will remain in the present quarters of the Department of Anatomy.

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